

**City University of Hong Kong  
Course Syllabus**

**offered by School of Data Science  
with effect from Semester A 2024/25**

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**Part I Course Overview**

<b>Course Title:</b>	Storing and Retrieving Data
<b>Course Code:</b>	SDSC5003
<b>Course Duration:</b>	One Semester
<b>Credit Units:</b>	3
<b>Level:</b>	P5
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites:</b> <i>(Course Code and Title)</i>	Nil
<b>Precursors:</b> <i>(Course Code and Title)</i>	Nil
<b>Equivalent Courses:</b> <i>(Course Code and Title)</i>	Nil
<b>Exclusive Courses:</b> <i>(Course Code and Title)</i>	Nil

## Part II Course Details

### 1. Abstract

This course offers knowledge of the relational database and an introduction to Hadoop/Spark system including the entity-relationship model for designing the relational database, principles of the database development process, the Structural Query Language for retrieving and storing data via a database, and the introductory level Hadoop/Spark content.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Describe principles of the relational database design and structural query language syntax	30%	✓		
2.	Explain the efficiency issue in database systems, including storage and indexing as well as query optimization	30%	✓	✓	
3.	Discuss modern database techniques such as JSON and NoSQL	10%	✓	✓	
4.	Explain the MapReduce computing framework and the basics of Spark	10%	✓	✓	
5.	Implement taught knowledge to develop a database application	20%		✓	✓
		100%			

**A1: Attitude**

*Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.*

**A2: Ability**

*Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.*

**A3: Accomplishments**

*Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.*

### 3. Learning and Teaching Activities (LTAs)

(LTAs designed to facilitate students' achievement of the CILOs.)

LTA	Brief Description	CILO No.						Hours/week (if applicable)
		1	2	3	4	5		
Lecture	Students will engage in lectures introducing relational database systems, principles of database design and development, syntax of structural query language, as well as fundamentals and introductory applications of Hadoop/Spark	✓	✓	✓	✓			26 hours/semester
Laboratory work	Students will engage in developing the ability of designing and developing the relational and big database as well as differences between retrieving and storing data via relational and big databases to generate applications.		✓	✓	✓	✓		13 hours/semester

Lectures cover not only the narrowly focused techniques in engineering economy but also the wider issues of the environment that affect engineering economic decision making. Students are expected to participate in class discussion when needed.

### 4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.						Weighting	Remarks
	1	2	3	4	5			
Continuous Assessment: 50 %								
<u>Group Project</u>		✓	✓	✓	✓		35%	
<u>Individual Coursework</u>	✓	✓	✓	✓			15%	
Examination: 50 % (duration: 2 hours, if applicable)								
<u>Examination</u>	✓	✓	✓		✓		50%	
							100%	

## 5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

### Applicable to students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Group Project	35%	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Individual Coursework	15%	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	50%	High	Significant	Moderate	Basic	Not even reaching marginal levels

### Applicable to students admitted from Semester A 2022/23 to Summer Term 2024

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Group Project	35%	High	Significant	Basic	Not even reaching marginal levels
2. Individual Coursework	15%	High	Significant	Basic	Not even reaching marginal levels
3. Examination	50%	High	Significant	Basic	Not even reaching marginal levels

**Part III Other Information** (more details can be provided separately in the teaching plan)

**1. Keyword Syllabus**

*(An indication of the key topics of the course.)*

- Introduction of Database and Its Development Process
- Data Modeling (Entity-Relationship model, meta model)
- Database Design Process and development
- Structured Query Language in Relational Database
- Storage and Indexing
- Query Optimization
- JSON and NoSQL
- Fundamentals of MapReduce and Spark
- Applications of Hadoop/Spark

**2. Reading List**

**2.1 Compulsory Readings**

*(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)*

1.	Lecture Notes
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**2.2 Additional Readings**

*(Additional references for students to learn to expand their knowledge about the subject.)*

NIL